**Name**: **Reba Hekker** **Subject Area: Integrated Algebra**

**Date**: **6/29/11**  **Grade Level: 8th grade**

**Time Required: 42 minutes**

**Description**: This is an introductory lesson on radical expressions. The purpose of this lesson is to teach students how to simplify radical expressions using the product and quotient properties of square roots. First, students will match pairs of equal radical expressions (one from each pair will be simplified and one will not be) by looking for approximations using calculators. They will then predict whether they think there is a way to make the same matches without using a calculator. Students will then read pages 805-807 in their textbooks using a Textbook Activity Guide. The class will then create an algorithm for simplifying radicals and do three guided practice problems together. Finally, students complete a Cloze passage.

**Essential Questions**:

* When is a radical expression simplified?
* How is a radical expression simplified?

**Standards**:

* (NYS) Math A.N.2
* (CCSS) RST 2, 3, 4, 5, 7

**Reading Skills**:

* Activating prior knowledge
* Questioning the text
* Drawing inferences
* Determining importance
* Synthesizing

**Thinking Skills**:

* Predicting
* Differentiating
* Generalizing

**Writing/Speaking Skills**:

* Write a prediction
* Take notes
* Discuss/compare with a partner
* Write an algorithm
* Complete cloze

**Title: Simplifying Radical Expressions**

|  |  |
| --- | --- |
| Objectives:  *At the end of the lesson, students will be able to…* | Assessments:*I will know they can do this because they will…* |
| 1. Recognize when a radical is simplified | 1. Identify HW problems as simplified |
| 2. Simplify radicals | 2. Do sample problems and homework |
| 3. Know the procedure for simplifying radicals | 3. Complete the cloze passage |

## Pre-Reading

**Procedure before Reading**:

1. Complete the attached “Do Now”

2. Write a sentence responding to “Predict whether there might be a way to simplify radicals ***without*** using decimal approximations.”

**During Reading**

**Procedure while Reading**:

1. Students will read pp805-807 in the textbook and complete the attached Textbook Activity Guide.
2. Class will write an algorithm for simplifying radicals and do three guided practice problems.

## Post-Reading

**Procedure after Reading:**

1. Students will complete a cloze passage.

**Learning Styles: Visual Auditory**

**Materials**:

* “Do now” problems
* Textbooks
* TAG handout
* Cloze passage

\*Please attach all student handouts

Do Now

Find three pairs of expressions that have equivalent values:

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\_\_\_\_\_\_ is equivalent to \_\_\_\_\_\_\_. I know because they are both approximately equal to \_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_ is equivalent to \_\_\_\_\_\_\_. I know because they are both approximately equal to \_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_ is equivalent to \_\_\_\_\_\_\_. I know because they are both approximately equal to \_\_\_\_\_\_\_\_\_

Predict whether there might be a way to simplify radicals ***without*** using decimal approximations.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Textbook Activity Guide

Holt Algebra 1: Chapter 11, Section 6: Radical Expressions, pp. 805-807

While reading the pages indicated above, complete each of the following activities, using the strategy codes below:

P = Discuss with a partner

WR = Write your OWN response

Skim = read quickly, for the stated purpose

RC = read closely, for the stated purpose

GO = complete the graphic organizer

\***MVP = most valuable piece of the lesson**

RC 1. (805) The objective for this section is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

RC, P 2. (805) One of the bolded vocabulary words for the section is “radicand.”

State the meaning here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

With your partner, tell the radicand of each of these expressions:

Expression Radicand

\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_

Skim 3. (805) Find the **first** bullet in the “Know-it Note” and complete the statement below

* the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has no \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ factors other than \_\_\_\_\_\_.

*(you already defined this)*

*list the first 6 perfect squares here:*

*\_\_\_\_, \_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_, \_\_\_\_\_\_, ……*

*Remember, this is a number that* ***divides evenly*** *into another*

**\*MVP**, RC 4. (806) Read the “Know-it Note” that describes the Product Property of Square Roots and read Example 2A.

Also read the Helpful Hint in the margin.

P, WR 5. Discuss this information with a partner and write a summary on the lines below:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

P, WR 6. With your partner, try to simplify the following radical expression:

RC 7. (806) Read the “Know-it Note” that describes the Quotient Property of Square Roots and read Examples 3A and 4A.

P, WR 8. Discuss this information with a partner and answer the following questions:

(SR = square roots)

How is the Product Property of SR ***similar to*** the Quotient Property of SR? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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How is the Product Property of SR ***different from*** the Quotient Property of SR?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cloze Passage – Simplifying Radicals

To \_\_\_\_\_\_\_\_ a radical expression means to make sure the radicand has no \_\_\_\_\_\_\_ \_\_\_\_\_\_ factors (other than 1). To check for this condition, list all numbers that \_\_\_\_\_\_ evenly into the radicand. If none of these \_\_\_\_\_\_\_\_ are a perfect square (that is, 4, 9, 16, \_\_, 36, 49, 64, \_\_, \_\_\_, …), then the radical is completely \_\_\_\_\_\_\_\_\_\_. If there is a \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ (other than 1) that divides into the radicand, here’s what you do:

1. Rewrite the radical expression as the \_\_\_\_\_\_\_\_\_\_\_ of two radical expressions.
   1. One of these is the \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_
   2. The other is whatever other number is needed to \_\_\_\_\_\_\_\_\_ to the original radicand
2. Find the \_\_\_\_\_\_\_ \_\_\_\_ of the perfect square and write it without the \_\_\_\_\_\_\_ symbol.
3. Leave the non-perfect square alone, \_\_\_\_\_\_\_\_ the radical symbol. Write it next to the square root found in step 2.

Cloze Passage – Simplifying Radicals (completed)

To simplify a radical expression means to make sure the radicand has no perfect square factors

(other than 1). To check for this condition, list all numbers that divide evenly into the radicand. If none of these factors are a perfect square (that is, 4, 9, 16, 25, 36, 49, 64, 81, 100, …), then the

radical is completely simplified. If there is a perfect square (other than 1) that divides into the

radicand, here’s what you do:

1. Rewrite the radical expression as the product of two radical expressions.
   1. One of these is the perfect square
   2. The other is whatever other number is needed to multiply to the original radicand
2. Find the square root of the perfect square and write it without the radical symbol.
3. Leave the non-perfect square alone, inside the radical symbol. Write it next to the

square root found in step 2.